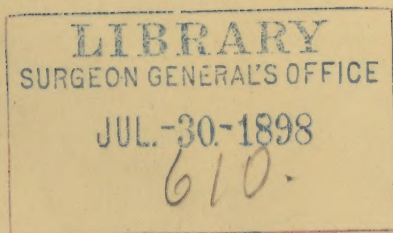


Pilcher (L. S.)

An account of the epidemic
of yellow fever + + + + +



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AN ACCOUNT OF THE EPIDEMIC OF YELLOW FEVER
WHICH APPEARED ON BOARD THE UNITED STATES
SHIP SARATOGA, IN JUNE, 1869.

By LEWIS S. PILCHER, M. D., *Passed Assistant Surgeon, U. S. N.*

The United States ship Saratoga, third rate, came to anchor in the harbor of Havana, May 10, 1869, having left New York on the 21st of April previous. Her complement of officers and men comprised 17 officers, 105 men, 78 naval apprentices, and 24 marines; in all, 224 souls. She remained at Havana, not changing from her original anchorage, till the 7th of June following, when, cases of yellow fever having appeared on board with two deaths, she put to sea. Prior to leaving, a medical officer was transferred to her from the United States steamer Penobscot, on account of the death of her own surgeon. She arrived at Key West, Florida, June 10th, whence she set sail the following day, June 11th, under orders to proceed to Portsmouth, New Hampshire. Owing to the rapid extension of the disease, she put into New York, arriving there June 20th. During the passage from Key West to New York three deaths occurred. Immediately on arriving at the lower quarantine-station in New York Bay, the sick, sixteen in number, were transferred to the hospital-hulk Illinois. Seven new cases reported on the 21st, and one on the 23d; these, with one exception, were also transferred to the Illinois.

At noon of the 23d, the United States steamer Frolic was towed down from the navy-yard, and the entire remaining ship's company transferred to her. The crew received an entire change of clothing, but were obliged to take with them their old hammocks, blankets, and mattresses. The officers were allowed to take their bedding and only the clothes they had on at the time.

The Frolic was anchored near the Illinois, and the officers and crew of the Saratoga retained on board of her, in quarantine, until July 7th, but two more cases of fever appearing during that time, one on the 24th, and one on the 28th of June. They were relieved from quarantine July 7th, and transferred to the receiving-ship Vermont, at the navy-yard. During the course of the epidemic, thirty-seven cases occurred, with seventeen deaths.

In the harbor of Havana, during the spring and early summer of 1869, at the same time with the Saratoga, were the United States steamers Albany, Narragansett, and Penobscot. The first of these, with one or two short intervals, had been there since November 15, 1868; the two latter had been either in the harbor of Havana itself, or in the neighboring ports of Cuba, since the beginning of March. The Albany and the Penobscot were in port at the time of the outbreak of the epidemic on the Saratoga. Of these vessels the Saratoga alone, at this time, was visited by the disease, although later in the season, on both the Albany and the Narragansett, a few cases occurred, and on the Penobscot, which left for the north at the same time with the Saratoga, seven cases reported as remittent fever, none fatal, occurred before reaching Portsmouth, New Hampshire.

During the summer of 1869, yellow fever was prevalent throughout the West India Islands, but not to such an extent as to be considered in any place as epidemic. Out of the seven vessels constituting our squadron in those waters at the beginning of the summer, but one escaped its attacks.

During the year there occurred in all throughout the squadron thirty-one cases of yellow fever,* exclusive of those on the Saratoga, with seven deaths, being a percentage of deaths to cases of .22, or one death to every 4.43 cases.

The Saratoga, first visited, suffered the most, both in number of cases and in their malignancy, the percentage of deaths in the thirty-seven cases being .46, or 1 death in every 2.17 cases.

* La Roche, in his work on yellow fever, vol. i, page 533, gives statistics of epidemics on twenty vessels, in tropical regions, gathered from published accounts, which give an average of 1 death to every 3.46 cases.

The following table shows the number of cases of yellow and remittent fever, respectively, that occurred on each of the vessels of the West India squadron during the year 1869, as reported:

Vessels.	REMITTENT FEVER.		YELLOW FEVER.	
	Cases.	Deaths.	Cases.	Deaths.
Albany.....	23	.....	1	1
Yantic	9	.....	8	3
Narragansett .....	.....	.....	14	1
Gettysburg.....	14	.....	8	2
Penobscot.....	7	.....	.....	.....
Saratoga.....	.....	.....	37	17
Total.....	53	.....	68	24

There can be little doubt but that some cases which were essentially identical with those reported as yellow fever, but which did not progress to a fatal termination, and did not manifest the worst phenomena of that disease, especially at the first appearance of the disease, before its true nature was recognized, were called and reported as cases of remittent fever. If so, and these cases could be placed in the proper column, the number of cases of yellow fever that really occurred in the squadron would be much increased, while the death rate, as compared with the cases in general, would be diminished. However, the figures as reported render sufficiently prominent the exceptional severity of the disease as manifested on the Saratoga.

No reason why the disease should have appeared sooner and in a more malignant form on board the Saratoga than on board her consorts can be found in the condition of the ship itself; which, on the contrary, was such as would tend to render it the least liable to become infected, and which afforded surroundings the best adapted to the care and favorable progress of such as should be attacked, should disease make its appearance. She was roomy and comfortable, well ventilated and lighted, and a model of neatness and cleanliness throughout. The *morale* of the ship's

company was excellent, and its general health unusually good. For six weeks previous to the appearance of the first case of yellow fever, there had not been a single case of sickness on board, even of the most trivial character. But though the ship itself was in this excellent condition, the circumstances in which it was placed were such as by their combination could not but be potent agencies in the production of the results in question. These were the season of the year and the non-acclimation of the ship's company, and the special evil influences pertaining to the harbor of Havana, and particularly to that part of it in which the ship was anchored.

In the latter part of May begins in Havana the so-called unhealthy season, which extends through the summer and into the fall, to the last of November. At the very beginning of this season the Saratoga arrived from the north with a crew entirely unacclimated, a time when the general climatic influences, at all times unfavorable to the unacclimated, tended most to the production of the special diseases incident to them. The harbor of Havana is a land-locked bay, surrounded on all sides by hills, except at a point on its northern aspect, where it communicates with the sea by a narrow channel. Its northeastern boundary is a narrow peninsula, less elevated at its junction with the mainland than in the rest of its course, permitting the prevailing easterly breezes to reach the harbor. The usual rise and fall of the tide in the harbor is very slight, while the only communication between the bay and the sea is narrow and somewhat tortuous; these conditions cause the harbor to assimilate in character to a great stagnant pool. The bay receives the water shed from the surrounding hills, the drainings from the village of Regla, on its southern shore, and the contents of most of the sewers of the city of Havana. From the shipping with which it is crowded during the greater part of the year it receives additional filth. These causes render its water very foul, and its stagnation favors the putrefaction of the filth which it contains, which process is hastened and aggravated by the uniformly high temperature at which the water is kept by the

conjoined influences of the Gulf Stream and the tropical sun. The effects of this are somewhat counteracted, during the so-called healthy or dry season, by the constant sea-breezes prevailing, and by the dryness of the atmosphere; but during the remainder of the year, when the sea-breezes fail, and at times are replaced by debilitating land-breezes, when the atmosphere is saturated with moisture, an opposite result obtains—the air becomes laden with the products of decomposition, and a high degree of virulency favored in their effects. The *Saratoga*, arriving at the beginning of this latter season, was anchored on the west side of the harbor, within a stone's throw of the quay lining the shore, and in close proximity to the track of a line of ferry-boats. The sea-breeze could reach her only after passing over the whole bay, becoming necessarily laden with its exhalations. The constant superficial agitation of the water in the immediate neighborhood of the ship by the ferry-boats favored, in an eminent degree, the rapid decomposition of the already putrescent matter contained in it, and the disengagement of the noxious effluvia resulting. In this position, without shifting her anchorage, the ship remained from May 10th to June 7th, when she put to sea, stricken with yellow fever. Three cases occurred nearly simultaneously: two on the 2d of June, those of Surgeon Quinn and Lieutenant Lamberton, and one on the 3d, that of private Bowler. No further cases occurred till June 7th, when two more persons were attacked. Of these three cases, occurring nearly simultaneously, the habits, circumstances, and relations of each differed greatly, agreeing only in the one point, that they were all equally exposed to the general evil influences already named, pervading and surrounding the ship. Her two consorts, the *Albany* and the *Penobscot*, were anchored in another part of the harbor, and both escaped untouched by the disease at this time, unless the febrile cases, mentioned as having occurred on the *Penobscot*, be considered as essentially identical with those on the *Saratoga*, though milder in degree. All the cases that occurred on the *Saratoga*, thirty-seven in number, are exhibited in the following general tabulated statement:

General exhibit of cases.

Number.	Name.	Grade.	Age.	Nativity.	Date of seizure.	Date of transfer to hospital-ship.	Result.	Date and day of death.	Remarks.
1	J. P. Quinn.....	Surgeon...	31	Vt.....	June 2....	.....	Death.....	June 6... 5th day	Partial suppression of urine ; convulsions ; coma ; no black-vomit.
2	B. P. Lambertson.....	Lieutenant	23	Pa.....	June 2....	.....	Recovery.....	.....	Urine for a time very scanty, albuminous, highly colored, containing bile pigment.
3	M. Bowler.....	Private.....	22	Ireland..	June 3....	.....	Death.....	June 7... 5th day	Died comatose ; black-vomit one hour before death.
4	J. Hudson.....	M. A.....	46	Va.....	Noon, June 7...	.....	Recovery.....	.....	Convalesced from third day.
5	F. Harrison.....	Nav. appr.	16	N. Y.....	Ev'g, June 7...	.....	Recovery.....	.....	Convales'd from fourth day.
6	C. Quick.....	Landsman.	21	N. J.....	Ev'g, June 13...	.....	Recovery.....	.....	Convalesced from third day.
7	B. Fitzgerald.....	Seaman...	48	Ireland..	Morn., June 14...	.....	Death.....	June 19.. 6th day	Black-vomit on last day.
8	J. Riley.....	Seaman...	21	Ireland..	Morn., June 14...	.....	Death.....	June 18.. 5th day	Epistaxis on third day ; black-vomit on fourth day.
9	J. S. Giraud.....	Paym'r.....	.....	N. Y.....	Morn., June 15...	June 20..	Recovery.....	.....	Epistaxis ; black-vomit ; long and tedious convalescence.
10	R. Anderson.....	Q. M.....	43	Prussia..	Morn., June 15...	June 20..	Recovery.....	.....	Condition precarious for some time ; convalescence tedious.

11	F. Robinson . . .	Landsman.	17	Va	Noon, June 15.	June 20..	Death	June 23.. 9th day	Mulatto, Epistaxis; black-vomit.
12	H. Diegel	Landsman.	30	Prussia..	Night, June 15.	.....	Recovery . . .	.....	Experienced pain only on left side of head and body.
13	A. Sweeney	Nav. appr.	13	N. Y	Night, June 15.	.....	Recovery . . .	.....	Convalesced from third day.
14	G. N. Flagg	Lieutenant	.....	Vt	Night, June 15.	.....	Death	June 20.. 6th day	Urine albuminous; black-vomit.
15	J. Anderson	Nav. appr .	16	Cal	Night, June 16.	June 20..	Death	June 20.. 5th day	Deficient in intellect, Delirious from the first. Particulars of death not ascertained.
16	W. Carter	Gunner . . .	.....	Pa	Morn., June 17.	June 20..	Recovery . . .	.....	Black-vomit shortly before death.
17	S. S. Blodgett . . .	Mate	21	N. Y	Morn., June 17.	June 20..	Death	June 20.. 4th day	Black-vomit shortly before death.
18	W. A. Failing	Mate	21	N. J	Ev'g, June 17.	June 20..	Recovery . . .	.....	Convalesced from third day.
19	W. G. Tompkins . .	Boatswain .	.....	N. J	Ev'g, June 17.	June 20..	Recovery . . .	.....	Convalesced from third day.
20	W. H. Palmer	Corporal . .	29	D. C	Morn., June 18.	June 20..	Death	June 27.. 10th day	Very robust man. Had profuse black-vomit.
21	J. Henry	Private	33	N. Y	Noon, June 18.	June 20..	Death	June 21.. 4th day	Prematurely old. Great prostration from the first; tongue dry and black, with raw edges on the second day; black-vomit. Black-vomit before death.
22	J. Reynolds	Private	25	Ireland..	Noon, June 18.	June 20..	Death	June 23.. 6th day	Excessive vomiting throughout the attack; black-vomit before death.
23	M. Harford	Private	31	Ireland..	Morn., June 19.	June 20..	Death	June 26.. 8th day	Excessive vomiting throughout the attack; black-vomit before death.
24	S. Rothberg	Nav. appr .	18	Poland . .	Eve'g, June 19.	June 20..	Recovery . . .	.....
25	J. Henneberger . . .	Private	21	N. J	Morn., June 20.	June 20..	Recovery . . .	.....

General exhibit of cases—Continued.

Number.	Name.	Grade.	Age.	Nativity.	Date of seizure.	Date of transfer to hospital-ship.	Result.	Date of death.	Remarks.
26	H. C. Raebel.....	Lieutenant	33	Germany	Morn., June 20.	June 20..	Death.....	June 25.. 6th day	Black-vomit; died in convulsions.
27	W. E. McMullen	Cap's clerk	22	Md.	Morn., June 20.	June 20..	Death.....	June 22.. 3d day	Complicated by advanced phthisis pulmonalis; no black-vomit.
28	J. O. Corsa.....	Nav. appr.	15	N. Y.	Morn., June 21.	June 21..	Death.....	June 26.. 6th day	Particulars of death uncertain.
29	F. W. Crans.....	Nav. appr.	15	N. Y.	Morn., June 21.	June 21..	Recovery.....	.....	Transferred to Naval Hospital, Brooklyn, June 21. Epistaxis; black-vomit. Epistaxis; black-vomit.
30	W. Watson.....	Q. M.....	23	Mass.....	Morn., June 21.	June 21..	Recovery.....	.....
31	L. S. Pilcher.....	Ass't surg.	24	Mich.....	Noon, June 21.	.....	Recovery.....	.....
32	W. W. Van Vleck	Lt. com'r.	25	N. Y.	Morn., June 21.	June 23..	Death.....	June 29.. 7th day	
33	A. L. Dixon.....	Carpenter	....	Maine...	Eve'g, June 21.	June 23..	Death.....	June 26.. 3d day	
34	J. C. Herbert....	Sailmaker	....	N. Y.	Eve'g, June 21.	June 23..	Recovery.....	.....
35	J. McQuade.....	Seaman	24	Mass.....	June 23.....	June 23..	Recovery.....	.....
36	H. Brown.....	Ord. sea'n.	24	England	June 24.....	June 24..	Recovery.....	.....
37	F. E. Pratt.....	Nav. appr.	16	Mich.....	Morn., June 28.	June 28..	Recovery.....	.....

An examination of these cases gives the following :

Total number of—		Per cent. of cases.	Per cent. of deaths to cases.
Officers.....	18	77	50
Men	105	9	33
Apprentices	78	9	29
Marines.	24	25	83
Souls on board	225	16	46

Earliest period of death, third day ; latest period of death, tenth day ; average period of death, fifth day.

Black vomit occurred in 14 cases ; recovery after black vomit in 1 case ; epistaxis noted in 5 cases ; recovery after epistaxis in 1 case ; particulars unascertained in 2 cases.

From the time that the ship left Havana until the evening of the 13th, a space of six days, no new cases occurred. During this time there was a succession of days of fine weather ; a gentle breeze from the northeast prevailed. All the hatches and air-ports were kept open. Those already ill progressed favorably, and the hope was entertained that the disease had been checked. A new case in the evening of the 13th, and two more the next morning, re-awakened apprehension. During the afternoon of the 14th the weather experienced a rapid change, becoming cold and stormy, with rain and wind. This continued through the night and the next day, necessitating the closing of the hatches, thus rendering the air of the vessel close and bad, while, at the same time, much necessary exposure to the inclemencies of the weather resulted to the officers and men. Although the ship made north of Cape Hatteras on the 15th, and the weather again became fine, with cool and refreshing breezes, the rapid extension of the disease dates from that day. Six cases on the 15th, one on the 16th, four on the 17th, three on the 18th, two on the 19th, and three on the 20th successively appeared. Of these two died before reaching New York, while a third, Lieutenant Flagg, expired just before the ship came to anchor. In many of these cases, in addition to the general influences, acting as predisposing and ef-

ficient causes, it was possible to trace special exciting causes which determined the attack. Thus, in one case, an officer while perspiring freely, became chilled by sitting in a draught of air; four hours after the fever was fully developed. Another, returning from the deck with his clothing wet with rain, neglected to remove it at once, sitting down for some time in his damp garments; an attack of the disease followed almost immediately. Another, after the arrival of the ship at New York, indulged once in liquor to intoxication. His debauch left him laboring under the fever, which resulted in his death. In the last case that occurred, that of the boy Pratt, on the Frolic, five days after the transfer from the infected vessel, he had lain down to sleep in a gangway of the vessel, where he became chilled through during the night. As a result, there followed a typical case of yellow fever, the stages well defined, and the icterus attending convalescence very marked.

In most of the large number of cases which occurred on the 21st, seven in all, particular causes of similar nature to those already given can be traced to which they may be referred. The large number of cases occurring on that day, and their almost complete cessation from that time, is somewhat remarkable, and seems to indicate the utility of the measures for disinfection which were adopted, and especially to be due to the speedy removal of the men from the infected ship to one free from such taint. In the circumstances attending the cases of yellow fever on this vessel, there were none which indicated that the disease was in any way propagated by contact with the sick, or by exposure to the emanations or secretions from their bodies. On the contrary, those who were most about the persons of the sick escaped entirely.

The apothecary and four nurses, all unacclimated and unprotected by a previous attack of the disease, who were with the sick continually, night and day, and, in some cases, unavoidably received upon their persons matters vomited by the dying, were none of them attacked.

Commander Whiting, who filled his cabin with the sick officers, and who was constantly among all the sick, encouraging them by cheerful words and aiding them by his attentions, was one of the two commissioned officers on board the vessel who alone escaped the disease.

The medical officer received from the Penobscot was able to resist the disease till after the arrival of the vessel at New York, when, consequent upon exposure for some time to the hot sun in passing from the Saratoga to the Illinois, and upon unusual exertion in superintending the removal of certain of the sick, and upon reaction from the mental strain of the preceding two weeks by the transfer of all care to others, he was attacked, the circumstances giving no support to any theory of contagiousness in the disease.

This officer was succeeded by Surgeon H. M. Wells, temporarily detached from the New York Naval Hospital, who, transferred with the rest from the Saratoga to the Frolic, remained until their release from quarantine. During this time he spent much of each day on board the hospital-hulk with the sick, being assiduous in his attentions to them, without contracting the disease. Further, notwithstanding the number of the sick transferred to the Illinois, not one of the quarantine officials or attendants was attacked by the disease. In the transfer of the sick special care was taken to prevent as much as possible any articles from accompanying them which might act as fomites.

Upon the arrival of the ship at quarantine active measures were adopted for disinfection. Carbolic acid was poured down the pumps, and introduced into the bilge at other points. Carbolated lime was strewn about the decks, and chlorine gas was liberated by the common salt mixture throughout the ship, the hatches being closed. During the summer following the latter measure was repeated several times, and in the intervals the most thorough ventilation secured.

Throughout the course of the epidemic, in the cases that occurred, there was absent any sthenic action, no furious delirium, no raging heat of the skin, no strong, full arterial pulsations. In

but few cases did any delirium occur, and then it was low and muttering in its character. The skin from the first, in the majority of cases, was warm and moist, and the pulse, though very frequent at the outset of the attack in most, yet was always weak and soft in character. Its variations and characteristics in the different cases were found to be valueless as an indication of the intensity or the tendency of the attack.

The following table exhibits its frequency from day to day in ten cases :

Names.	Pulsations per minute.					Result of case.
	1st day.	2d day.	3d day.	4th day.	5th day.	
Quick.....	112	98	66	60	72	Recovery.
Fitzgerald.....	90	76	76	68	76	Death on night of fifth day.
Riley.....	100	90	92	92	100	Do.
Giraud.....	112	90	84	92	.....	Recovery.
R. Anderson.....	96	72	60	68	76	Do.
Robinson.....	120	88	88	58	64	Death on ninth day.
Diegel.....	96	60	60	.....	.....	Recovery.
T. Anderson.....	120	92	88	.....	.....	Death on fifth day.
Carter.....	130	88	92	.....	.....	Recovery.
Blodgett.....	104	100	88	.....	.....	Death on fourth day.

Complete suppression of urine occurred in no case. In the majority of cases, even of those terminating fatally, its secretion remained free. The nearest approach to suppression was in the case of Surgeon Quinn, the symptoms attending whose death indicated uræmic poisoning. In other cases the urine, though free, was highly albuminous, a condition which supervened in such of those cases which were at all prolonged, whether eventuating in death or recovery, as were under the observation of the writer. In the cases which were treated wholly on board the quarantine hospital-hulk, no examinations of the urine, as to the presence of albumen, were made. The condition of the bowels presented no features worthy of note. More or less constipation was present at the outset

of many of the cases, relieved by gentle cathartics in all cases. The tongue, at the outset, was covered with moist white fur, in some cases presented a punctated appearance, afterward changing in its appearance as the disease progressed, either gradually clearing off, or becoming dry, and brown or black, and in some cases clearing off rapidly, presenting then a raw appearance, as if entirely denuded of its epithelium. In the three cases which terminated fatally, during the passage from Key West to New York, death was heralded in each by this latter condition of the tongue, the denudation beginning first at the edges, on each side, and thence spreading over the whole tongue. In the last of these cases, in which life was prolonged to the sixth day, the dorsum of the tongue became dry, black, and scaly during the last day.

Apparent heat of the head, out of proportion to that of the body in general, was noticed in every case. This persisted for some time after all other symptoms ameliorated. Its subsidence was regarded as an unerring indication of the establishment of convalescence.

Intense frontal or orbital headache, described as passing from temple to temple through the eyes, with injection and suffusion of the conjunctiva, was a constant symptom attending the beginning of an attack. Pain in the back was also usually great. In one case pain in the calves of the legs was bitterly complained of. In one case pain was experienced in the left temple, and in the left side of the body only. Tenderness of the epigastrium and a peculiar sensation of fullness at that point, especially on deep inspiration, were usual.

The most prominent and distressing symptom was gastric irritability. In some cases, despite the careful avoidance of all irritation, uncontrollable vomiting persisted through the first stage of the disease. In these, after a short calm, in nearly every instance, the vomiting again recurred, soon presenting the peculiar appearance termed black vomit.

In the greater number of cases, however, after one or two paroxysms of vomiting when first seized, though the irritability of

the stomach remained great, it was repressed by the measures adopted; the slightest indiscretion, however, again provoking vomiting. After the period of calm following the subsidence of the symptoms attending the febrile paroxysm—in many of these latter also—vomiting then appeared spontaneously, ending in black vomit and death. Much thirst was complained of in most of the cases.

The general measures of treatment adopted on board the *Saratoga* were directed toward supporting the system, and aiding it in its efforts to eliminate the poison with which it was saturated. Special symptoms it was endeavored to meet as occasion required.

The treatment as continued on board the hospital-hulk, after the transfer of the cases thither, was essentially the same. All internal remedies of a depressing character were avoided; indeed, the irritability of the stomach universally precluded the administration of any internal remedy, even had such been deemed advisable. The most accessible point was the skin, the action of which it was endeavored to sustain and promote by wrapping the patient in blankets wrung out in hot water—as a substitute for the hot bath, which the want of a bath-tub prevented from being adopted—and by sponging the skin, from time to time, with tepid water and vinegar. At the earliest possible moment, food and stimulants were methodically administered according to the condition of the patient.

In the whole course of the epidemic, the most prominent symptom which presented itself was the extreme irritability of the stomach; the local measures of treatment adopted were chiefly directed toward this, to prevent its occurrence if possible, and to lessen its severity when present. A careful avoidance of every source of irritation, whether medicinal or alimentary, was insisted upon; counter-irritation by sinapisms to the epigastrium was effected when occasion seemed to demand; pellets of ice were allowed to melt in the mouth, for the double purpose of controlling gastric irritability and of alleviating thirst; nothing but fluids, and those in very small quantities often repeated, were adminis-

tered. These were the measures that were found to be most effectual in preventing and alleviating this symptom. In addition, various medicaments, as carbolic acid, turpentine, aromatic spirits of ammonia, the effervescing draught, and others, were used in most of those cases in which the measures first mentioned did not prove sufficient, but without decided benefit.

Frontal headache, invariably great, was alleviated by cold applications to the forehead and temples. Pain in the back, much complained of, by sinapisms and cuppings.

The importance of avoiding carefully any unusual exposure or fatigue, or irregularities of diet, or the giving way to excessive anxiety, and of preserving the general condition of the body in the most perfect health possible, as prophylactic measures, was plainly shown by the circumstances which seemed to determine the attack in many instances, some of which have been mentioned.

In a number of instances in which men presented themselves at once upon the first appearance of those symptoms which usually marked the onset of the disease, as chills, heat of head, intense frontal headache, and fever, with very frequent pulse and furred tongue, from fifteen to twenty grains of quinine were given immediately. In a short time complete relief was experienced, with no recurrence of the symptoms. Whether this result was a mere coincidence or an effect cannot be said, yet the impression grew continually stronger that it was the effect of the quinine administered, as although in all cases the result was not so favorable, yet, in no cases presenting the same symptoms, in which quinine was not administered at once, as stated, did the disease fail to continue and to pass through its usual course.

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